

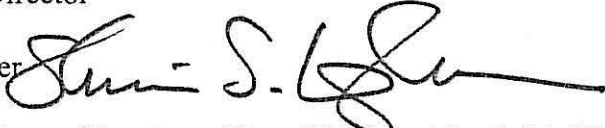


**CITY OF SAN DIEGO
COUNCILMEMBER SHERRI S. LIGHTNER
DISTRICT ONE**

MEMORANDUM

DATE: April 20, 2009

TO: Jim Barrett, Water Department Director

FROM: Councilmember Sherri S. Lightner 

SUBJECT: Request for Continuance of the Reconsideration of Item 330 from March 24, 2009 Docket (Limnology and Reservoir Detention Study of San Vicente Reservoir for the IPR/RA Demonstration Project)

SUMMARY

I requested a reconsideration of Item 330 from the March 24, 2009 Docket (Limnology and Reservoir Detention Study of San Vicente Reservoir for the IPR/RA Demonstration Project) to allow further discussion of the reason for the proposed contract and the utility of its results. I am concerned that the method chosen for modeling without subsequent validation of the model could produce inaccurate results. The outcome of which may not assure reservoir twelve month retention of the injected IPR water, thereby potentially jeopardizing either the success of the IPR project or the health of the residents, and also possibly resulting in an ill-advised expenditure.

It is my suggestion that the proposed modeling and assessment technique for the inclusion of IPR water into the San Vicente Reservoir be reviewed by both the Independent Advisory Panel (IAP) and the Department of Public Health (DPH) to assure that the results will be adequate to permit the demonstration IPR project.

DISCUSSION

Because of my concerns related to the modeling performed on the San Vicente Reservoir, I requested other work performed on the reservoir. An analysis documented in Water Quality Assessment of San Vicente Reservoir Enlargement by Flow Science Incorporated dated October 25, 2005, is for a one-dimensional modeling of the San Vicente Reservoir to evaluate parameters important to the "health" of the reservoir. The computer program, DYRESM-WQ, uses a process-based physical model integrated with a biochemical model and must be calibrated to give useful results.

In the Item heard by Council, it was inferred that the consultant considered for the sole source contract had special knowledge related to the reservoir. In particular, that the consultant had a model which reflected the reservoir geometry. The referenced report indicates that the data used to characterize the reservoir geometry is based upon data from a 1948 survey by the United States Geologic Survey (p. 3) and the parameters needed for evaluation are data, which has been collected over the years at the reservoir.

The reservoir depth data did not appear to have been confirmed with any recent sounding data – it would be interesting to know if there has been any change in the reservoir topography over the last sixty years and if that change is anticipated to have any effect.

The spatial variation of depth did not seem to be considered in the analysis. That measured data related to water inflow, water outflow, air temperature, wind velocity and humidity and water temperatures, dissolved oxygen content and salinity – the last three parameters as a function of water depth and inflow time. So the data used to perform the study does not seem to be “special.” The data measured at Station A (near the dam) from 1992 through 2004 include temperature and dissolved oxygen (DO) profiles, which show consistent patterns of thermal stratification and DO profiles.

The purpose of the study was to optimize the inlet location for the San Vicente Pipeline (SVPL). It considered the stratification of the reservoir and favorable outlet water composition in the optimization. It also included tuning of the model to create the “calibrated model.” This calibration included the application of a 10% increase on the wind velocity. This is the only factor which is mentioned. The reasons for tuning the model are shown by the results presented in Figure 8 – note the difference in the water level before and after calibration.

The comparison of measured and simulated parameters caused me concern, because the error in some cases was the order of the data value. The evaluation presented in Table 1 shows the error between the calculated and measured values. The plots of measured vs. calculated results are given in Figures 15, 16 and 17. There is no discussion of why there is a discrepancy in the representation of the three important parameters of temperature, salinity and dissolved oxygen, in particular temperature and salinity are a better match, while the dissolved oxygen is not.

The type of study proposed for the current project can be useful if used to evaluate a number of parameters in a qualitative way. As long as the modeling is consistent, the results should give an indication of the relative merit of different options, but calibration with the actual physics of the situation still must be done to confirm the modeling.

My concern is that the one-dimensional model required tuning to “adequately” predict the one-dimensional behavior of the unmodified reservoir, and there is no provision to tune the three-dimensional model of the enlarged reservoir with the current contract. The Statement of Work for the contract with Flow Sciences is for a three-dimensional model of the reservoir prior to draw down. It is proposed that this model be tuned (calibrated) with tracer data from 1995 and other water quality data obtained in 2006 and 2007 for the existing reservoir – not for the increased capacity reservoir. This tuning will then be applied to a new model’s geometry or enlarged model for the increased capacity reservoir.

There will be no opportunity to compare the final model with any data, because it will not be possible to collect the data prior to the end of the contract, and there is no provision in the contract to do this. I do not understand how the results can be used without some correlation to the enlarged reservoir's water quality performance and the predicted optimal inlet location.

I also wonder whether additional modeling is the best technique to evaluate the situation. The Virginia reservoir which injects processed water was not modeled – it has been in operation for thirty years. Perhaps their experience can be used.

QUESTIONS/COMMENTS

- For the San Vicente Reservoir there is already some calibrated one-dimensional modeling and extensive testing – what are the additional benefits of the three-dimensional modeling of the mixing flow analysis coupled with the biochemical model?
- How likely is it that follow-on work will not be required to validate the results?
- Will the results of an uncalibrated model be acceptable to the IAP and the DPH?
- Data for the reservoir depth is not proprietary, and it is 60 years old. Has it been updated to account for any silting, which may have occurred?
- Locations chosen for one-dimensional modeling are not identified. There is one point selected for a large number of plots near one of the exits. This is Station A near the dam.
- The one-dimensional computer model evaluated certain parameters that did not correlate well. This is shown in Table 1 of the referenced document. It is not clear if this correlation is before or after the calibration of the model.
- The outflows were grossly different before “calibration” of the model. The only indicated technique for tuning was the wind velocity. It would seem that the water losses (Figure 8) could be ascribed to evaporation (wind velocity, temperature and humidity) and permeation losses.
- There is extensive data for the reservoir in the existing condition (pre-draw down) from 1992 to 2007 and tracer studies conducted in 1995.
- The proposed modeling is to do a three-dimensional model for the existing reservoir, which couples 3D flow analysis with the biological component. This model would then be tuned to the data – including the tracer data. The model is then to be enlarged for the enhanced capacity reservoir and predict performance. This uncalibrated model would be used to optimize inlet location. There would be no comparison with the actual reservoir, and therefore the applicability of the results would be questionable.

RECOMMENDATION

I request a continuance until May 11, 2009, when the first meeting of the IAP is held, to provide the IAP the opportunity to vet the Flow Science proposal so that Council can have the benefit of their review and conclusions. While a notice to proceed has been issued, I request that the approved funds for this contract not be expended until after the IAP's findings are considered by the Mayor and/or Council as appropriate.

SL: jr

cc: Honorable Mayor Jerry Sanders
Councilmembers
Jan Goldsmith, City Attorney
Andrea Tevlin, Independent Budget Analyst